AD-A252 660

**REPORT ON THE FEASIBILITY OF THREE
DATA BASES AS SOURCES FOR THE
AMBULATORY RESOURCE ANALYSIS PROJECT**

Contract Number:MDA903-88-C-0071
Task Order No. 6-89/90

Task Order Proponent:Lieutenant Colonel Stuart W. Baker, M.S.

92-17002

Submitted To:

U.S. Department Of Defense
Office of the Assistant Secretary of Defense
Health Affairs
Three Skyline Place, Room 1507
5201 Leesburg Pike
Falls Church, VA 22041-3201

This document was prepared by Paul Mermelstein, Project Director; David Bodycombe, Project Manager; Barbara Jones, Medical Records Consultant; Karl Kosok, Statistical Programmer; and Scott Armstrong and Lai Lee, Project Analysts.

January 8, 1991

92 6 29 002

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 8 January 1991	3. REPORT TYPE AND DATES COVERED

4. TITLE AND SUBTITLE
REPORT ON THE FEASIBILITY OF THREE DATA BASES AS SOURCES FOR THE AMBULATORY RESOURCE ANALYSIS PROJECT

5. FUNDING NUMBERS
C-MDA903-88-C-0071
TA-6-89/90

6. AUTHOR(S)
Birch&Davis Associates, Inc.
Task Order Proponent: Stuart W. Baker, LTC, MS, USA

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Birch&Davis Associates, Inc.
8905 Fairview Road
Suite 300
Silver Spring, MD 20910

8. PERFORMING ORGANIZATION REPORT NUMBER
MDA903-88-C-0071

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
OASD/HA/HSO/RAMS
3 Skyline Place, Suite 1507
5201 Leesburg Pike
Falls Church, VA 22041-3203

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for Public Release: Distribution is Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)
The Resource Analysis and Management Systems (RAMS) office of DoD Health Affairs is developing a strategy for resourcing decision support for ambulatory care. The strategy will be based upon an ambulatory care patient case-mix classification system. Such a system would have far reaching implications for the Military Health Care System, affecting the collection, reporting, and use of ambulatory care data. The assessment of case-mix classification systems will consider a number of issues, including how well the classification system: Encompasses the types of services provided; Accommodates case-mix; Reflects the use of ancillary care personnel; Reflects the actual levels of health resource use; and Reflects the unique properties of the military health care system.

14. SUBJECT TERMS Ambulatory Case Mix; Ambulatory Resource Allocation; Ambulatory Classification; Ambulatory Decision Support; Uniformed Services Treatment Facility (USTF) Case Mix; Episode of Illiness; Ambulatory Visit Groups (AVGs); Ambulatory Patient Groups (APGs); Resource-Based Relative Value Scale (RBRVS); Ambulatory Work Units (AWUs)

15. NUMBER OF PAGES
65

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

TABLE OF CONTENTS

*　　　*　　　*　　　*　　　*

Appendices

LIST OF EXHIBITS

LIST OF EXHIBITS (Continued)

CHAPTER I

INTRODUCTION

I. INTRODUCTION

The Resource Analysis and Management Systems (RAMS) office of DOD Health Affairs is developing a strategy for resourcing decision support for ambulatory care. The strategy will be based upon an ambulatory care patient case-mix classification system. Such a system would have far reaching implications for the Military Health Care System, affecting the collection, reporting, and use of ambulatory care data.

The assessment of case-mix classification systems will consider a number of issues, including how well the classification system:

- Encompasses the types of services provided

- Accommodates case-mix

- Reflects the use of ancillary care personnel

- Reflects the actual levels of health resource use

- Reflects the unique properties of the military health care system

This study will explore these and other issues pertinent to some of the better developed ambulatory patient classification systems using available data sources. This report assesses the adequacy of the available data sources for the resolution of the study issues.

1. PURPOSE OF THE STUDY

As noted above, this task is part of a larger effort that seeks to address the global issues described above. The purpose of the present effort is to establish the usefulness of the three data bases in the support of project activities. These data bases are the:

- Uniformed Services Treatment Facility (USTF) Data Base

- Civilian Health And Medical Program of The Uniformed Services (CHAMPUS) Data Base

- U.S. Army Ambulatory Care Data Base (ACDB)

Project activities in which these data bases are to be employed include:

- Evaluation of alternative resourcing systems (Resource-Based Relative Value (RBRVS), Ambulatory Work Units (AWU), etc.)

- Definition of episodes of illness for selected diseases

- Comparative analysis of differences in case-mix and service utilization between the civilian and military populations

- Assessment of the statistical and clinical adequacy of the AVG (Ambulatory Visit Groups) and the APG (Ambulatory Patient Groups) grouping methodologies

- Determination of the types of data that should be collected as part of the Standardized Ambulatory Data Record (SADR) and related DOD health information systems to support ambulatory case-mix assessments

The usefulness of these data bases will be gauged by a number of dimensions that include:

- Sufficient data elements

- Patient demographics

- Level of reporting

- Number of observations

- Time period

- Quality

In addition to an exploratory analysis that considers the properties of the data, we will also use the data to provide a preliminary description of the patient population, case-mix, and service utilization patterns.

2.   DESCRIPTION OF THIS REPORT

This report is organized into seven brief chapters that include this introduction. Much of the discussion is dedicated to describing the patient population and its associated case-mix. Other discussions review the types of problems encountered in using the data and how these problems affect their utility for subsequent analyses of the types described above. This report concludes with recommendations regarding the most appropriate use for each of these data bases.

CHAPTER II

METHODOLOGY

II. METHODOLOGY

This discussion provides some general background regarding the three data bases examined in this study. This background includes information on the health care system that generates the data, the reason for data collection, the types of data collected, data processing and editing activities, and the content of the data bases that serve as the working files for this effort.

1. DESCRIPTION OF THREE STUDY DATA BASES

Three data bases with some relevance to the military were provided for use in the present study. These data bases were:

- Uniformed Services Treatment Facilities (USTF) Data Base

- Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) Data Base

- U.S. Army Ambulatory Care Data Base (ACDB)

The structure and content of each of these data bases is described below.

(1) Uniformed Services Treatment Facilities (USTF) Data Base

The Military Construction Act of 1982 authorized 10 former Public Health Service hospitals and clinics to provide free comprehensive health care services to eligible beneficiaries of the Armed Forces, the Coast Guard, the Commissioned Corps of the Public Health Service, the National Oceanic and Atmospheric Administration (NOAA), and lighthouse keepers. Eligible beneficiaries include active-duty personnel, their dependents, retirees and their dependents, and survivors.

The USTF functions similarly to a capitated health care system. Reimbursement is based upon the first annual visit of a beneficiary.

The USTF Data Base ensures appropriate reimbursement for "member" beneficiaries and also documents patterns in health services utilization. Each facility continuously collects data on inpatient admissions and ambulatory visits that are submitted on a monthly basis to a contractor, Vector Research, Inc., for edit processing. At year-end, all corrected monthly data from all USTF's are processed to create the annual USTF data base.

Each data base record includes the following data:

- Characteristics of the facility, patient, sponsoring beneficiary, and provider

- Inpatient admission, discharge, patient status, diagnoses, procedures, and third party reimbursement (where applicable)

- Outpatient services by date of service, procedure, and associated diagnosis (up to six)

Any individual data base record can contain data on more than one outpatient encounter.

The monthly data tape from each facility must pass a series of edits and may be returned to the facility for reprocessing if it is below an established standard. The edits only inspect data fields for prima facie errors (e.g., digit check to find nonnumeric characters in numeric fields, etc.) and not contextual errors based upon the interrelationships of different fields.

Our working data base includes 762,752 inpatient and ambulatory care records. Most, 86 percent, of the records on the data base are for 1988, another 13 percent are from 1987, and the rest are from other years and are possibly miscodes.

(2)   Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) Data Base

The Department of Defense's CHAMPUS program provides civilian health services to its beneficiaries, as opposed to treatment provided through the military or uniformed services MTFs.

The purpose of the CHAMPUS data base and associated ADP system is to provide an automated means of processing CHAMPUS claims to completion on a timely basis, and to be the repository of related records. Data are collected continuously by various Fiscal Intermediaries (FIs), and then sent to CHAMPUS for consolidation.

Each record represents a claim, a partial claim, or a correction/modification of a previously submitted claim. The records contain variables associated with:

- Claim identification

- Finance and payment

- Hospital/clinic encounter characteristics

- Sponsor and patient demographic characteristics

- Health care provider characteristics

The claim ID, financial data (including diagnosis), and sponsor and patient demographic variables occur once per record, and is referred to as the "header". The hospital/clinic encounter variables and health care provider variables, may occur 0 to 32 times per record, and include the health service procedure codes. These variables are referred to as the "detail records" of the claim record.

The records made available for analysis contain only the professional services claims (record type seven) submitted during 1987 (90 percent) and 1988 (10 percent). These claims may represent either inpatient or outpatient charges for a given record. Whether they are inpatient or outpatient claims, they may also include drug charges.

(3)   U.S. Army Ambulatory Care Data Base (ACDB)

The ACDB was developed under the auspices of the U. S. Army (USA) Medical Department (AMEDD). Envisioned as part of the AMEDD Performance Measurement Study (PMS), this effort was ultimately subsumed under the DOD Tri-Service Performance Measurement Study in 1986. The focus of this effort was on the creation of a decentralized and automated system for collecting ambulatory care data that are relevant to clinical practice and research.

The ACDB consists of outpatient data in over 70 clinical specialties at six USA medical treatment facilities (MTF) and spans a period from January 1986 through September 1987. The core data base contains data on:

- **Patient characteristics**--includes date of birth, sex, race/ethnicity, eligibility status

- **Outpatient visit characteristics**--includes visit date, diagnoses, procedures, disposition, place of visit, new/old patient, provider, and provider time

- **Provider characteristics**--includes provider type, specialty, military service, position, and status (permanent/other)

The ACDB was originally structured in a hierarchical data base management system called FOCUS. The data were later restructured into sequential files where each record contained data associated with a specific patient visit.

Data were collected on 3,108,741 patient encounters. The data base used for this feasibility assessment is based on a universe of inquiry of approximately 2.7 million records that were collected through April 30, 1987. After this date, data collection form revisions were instituted. The data base was subjected to extensive edits and the resultant "cleaned" data base consisted of approximately 1.1 million records. A "split half" of this data base, consisting of 516,006 encounters, was used in the feasibility assessment.

2.   ASSESSMENT METHODOLOGY

The assessment considered the utility of the data for describing the patient population and its associated case-mix/utilization patterns. To make the analysis manageable, we have focused on a few key variables that support the types of case-mix analyses planned for this study. These variables are:

- Patient age

- Patient sex

- Patient ID

- Patient military service branch

- Patient duty status

- Service facility

- Provider ID

- Diagnoses

- Service procedures

- Dates of service

- Type of service (ambulatory or inpatient)

The first step of the assessment entailed close examination of the characteristics of each of the study variables. These characteristics included:

- Frequency distribution

- Measures of central tendency (where appropriate)

- Range and variance

- Missing values

- Improper or incorrect codes

In developing a subset of data suitable for study, we also deleted selected records because they had one or more of the following properties:

- Represented inpatient encounters

- Patient was not an eligible beneficiary

- No reported diagnoses

- If date of birth was missing or later than the data year

- Patient sex was missing

The analysis assessed the potential biases associated with exclusion of these records.

Once we had arrived at a suitable study file, we used the data to both describe the demographic and service characteristics of the respective patient populations as well as the associated case-mix/utilization patterns.

Lessons learned from efforts to use the data were applied to an examination of issues that affect the application of data bases in other project activities, specifically:

- Scope of the data

- Data structure

- Completeness and accuracy

- Time series

- Relevance to the military

CHAPTER III

PROPERTIES OF THE DATA

III. PROPERTIES OF THE DATA

The following discussion addresses two general categories of problems that are associated with the data: (1) missing and erroneous data and (2) potential biases associated with excluding erroneous data from the data base. Each problem is analyzed in a separate section below.

1. MISSING AND ERRONEOUS DATA

The following discussion address the problems associated with missing and incorrect data in the three target data bases. A separate discussion is devoted to each data base. The focus is on the adequacy of diagnostic and procedural codes that are critical to the grouping of ambulatory visits.

(1) Uniformed Services Treatment Facilities (USTF) Data Base

In the assessment of missing data, we focused on the basic data elements that will be used to group the data, especially patient age and sex, procedure codes, and diagnostic codes. Initial analyses of the data file determined 14.5 percent of the records were incomplete with respect to these variables. Missing diagnostic codes were the major symptom of this problem.

Even when diagnostic data were available, the coding was haphazard. Diagnostic codes should have a maximum length of six characters including a decimal point and be left-justified with leading zeroes. There were frequent departures from this model in the USTF, including:

- Erratic inclusion of the decimal point

- Incorrect placement of the decimal point

- Imbedded blanks

- Leading blanks

- Invalid lead alpha characters (A, B, C, Z, OV)

- All zeroes

- Fourth and fifth digits missing when required

A SAS macro was developed for correcting these problems where possible.

Procedural coding also showed inconsistencies and inaccuracies. Initial analyses suggest that approximately 19 percent of the procedure codes were invalid and out of conformance with CPT standards. The following six nonstandard codes were used with considerable frequency:

- 00000--No Recorded Diagnosis
- 90095--Data Entry Error
- 99500--DoD Clinic Visit
- 99501--Clinic Count (Different from clinic visit)
- 99520--Outpatient Service With No Charge
- 99999--Nonpatient Pre- Or Post-operative Examination

(2)   Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) Data Base

While analyzing this data base, we focused on the development of an approach to convert these data from individual claims to a record unit that represents an individual encounter.

A hinderance to developing this approach was the lack of documentation detailing how a "correct" claim record should have been input and formatted. Partial documentation has recently become available and has helped in determining which claim records and associated detail records (containing procedure codes and visit counts) needed to be extracted and reformatted to create an ambulatory encounter based record.

Missing values for data fields in the claim records do not appear to be a problem. Additionally, the quality of the diagnosis and procedure coding (i.e. valid coding) is very good, which one expects from a claims data base. However, knowledgeable individuals have cautioned that the appropriateness of the diagnosis on CHAMPUS records may be questionable because the payment or claim completion does not rely on an accurate diagnosis.

Claim records identified as a Fiscal Intermediary (FI) denied claim, a CHAMPUS denied claim, a fraudulent claim, a duplicate claim or erroneous claim due to an FI error will be removed from the consideration of this study. Claim records that are resubmitted for adjustments will be included so that adjusted procedure service counts and billings may be included on the final encounter record.

Valid claim records that have procedures that have been denied will have these procedures deleted. Reasons for the procedure denials include instances where there have been duplicate billings (excluded for coordination of benefits), the claimant was not eligible, the service was not a covered benefit, other insurance paid in full, the filing limitation was exceeded, the DEERS reply was negative, or for other reasons (coded as "other" denial but not clearly defined by the available CHAMPUS manuals.

Individual encounters often have incorrect or "time period" dates listed rather than an actual date of service, and there is a lack of uniformity in "episode" billing by the FIs. Additionally, any claimant in the CHAMPUS data base could feasibly receive treatment for a segment of an episode of illness from other health systems (i.e. MTFs). These observations noted above indicate that the data available in this data base would be of little use for researching episodes of illness.

(3)   U.S. Army Ambulatory Care Data Base (ACDB)

In exploring the characteristics of unduplicated patients in the ACDB file, we found the file to be virtually complete in terms of age and sex.

Diagnostic coding is complete. Coding parallels the ICD-9-CM with the addition of 107 "S" codes that represent psychosocial problems. The most frequently cited diagnosis, V65.5, represents a "person with feared complaint in whom no diagnosis is made." It has been noted elsewhere[1] that this diagnosis may have been misused and became a catchall category when a more suitable diagnosis could not be readily located.

The ACDB study included a "rule out" field to give practitioners added flexibility in assigning diagnoses. This field was completed for only 4 percent of the data base encounters and resulted in the addition of only two diagnoses to the 150 most frequent diagnoses in the file. The added diagnoses were "rule out multiple sclerosis" and "rule out person with feared complaint in whom no diagnosis is made."

Extensive use of nonstandard procedure codes was made in the ACDB to accommodate the unique aspects of health care services provided in the military. Twenty of the 25 most frequently reported procedures were based upon these nonstandard codes. An extensive cross-walk effort would have to be undertaken to bring this coding in line with CPT-4 standards.

EXHIBIT III-1

NUMBER[1] AND PERCENT DISTRIBUTION OF
UNDUPLICATED PATIENTS BY INCLUSION STATUS
UNIFORMED SERVICES TREATMENT FACILITIES DATA BASE

CHARACTERISTIC	INCLUDE		EXCLUDE[2]	
	No.	Percent	No.	Percent
AGE				
TOTAL	177,691	100.1	51,535	99.9
< 1	2,296	1.3	528	1.0
1 - 4	10,714	6.0	3,515	6.8
5 - 14	15,164	8.5	4,515	8.8
15 - 19	10,674	6.0	3,095	6.0
20 - 29	21,351	12.0	5,305	10.3
30 - 39	17,166	9.7	4,756	9.2
40 - 49	21,946	12.4	6,971	13.5
50 - 59	31,016	17.5	10,689	20.7
60 - 64	17,917	10.1	5,983	11.6
> 64	29,447	16.6	6,178	12.0
SEX				
TOTAL	177,691	100.0	51,477	99.9
Male	84,586	47.6	23,443	45.5
Female	93,105	52.4	28,034	54.4

EXHIBIT III-1

NUMBER AND PERCENT DISTRIBUTION OF
UNDUPLICATED PATIENTS BY INCLUSION STATUS
UNIFORMED SERVICES TREATMENT FACILITIES DATA BASE

CHARACTERISTIC	INCLUDE		EXCLUDE	
	No.	Percent	No.	Percent
RELATION TO SPONSOR				
TOTAL	158,056	100.0	45,296	100.1
Spouse	62,369	39.5	19,157	42.3
Self	61,699	39.0	14,836	32.8
Child	33,988	21.5	11,303	25.0
MILITARY SERVICE				
TOTAL	175,916	99.9	50,845	99.0
Army	60,051	34.1	20,957	40.8
Navy	47,556	27.0	10,997	21.4
Air Force	39,989	22.7	12,054	23.5
Coast Guard	18,519	10.5	3,970	7.7
Marines	8,967	5.1	2,600	5.1
Public Hlth Serv	834	.5	267	.5

1. The number of reported observations changes from variable to variable due to missing data.

2. Exclusions were for records with missing diagnosis, sex, or date of birth; and individuals serving outside of the Armed Services or the U.S. Public Health Service.

The biggest problem encountered with this file in terms of missing data relates to excluded fields. The ACDB Data Dictionary documents 73 data elements in the ACDB file. For this effort, we had access to 26 of these elements. While some of the missing data elements were tangential to the purposes of the current study, some of the more significant exclusions were:

- New/old patient

- Place of visit

- Patient disposition

- Patient military service category

- Patient race/ethnicity

- Provider position

2. POTENTIAL BIASES ASSOCIATED WITH RECORD EXCLUSION

A number of records from all three data bases have either been removed or will be removed due to incorrect or missing data in critical fields or because they are otherwise out-of-scope, representing, for example, inpatient care or a beneficiary group that is of low relevance to the military. These exclusions are likely to be random and not affect the underlying population from which the data arise. However, it is important to determine if this is, in fact, the case and whether adjustments must ultimately be made to the data.

(1) Uniformed Services Treatment Facilities (USTF) Data Base

It is important to note that all inpatient records were excluded before any of the following analysis of excluded or included records was performed. Furthermore, all ensuing demographic analyses are based upon unduplicated patient records. Exhibit III-1 compares differences between included and excluded patients in terms of selected demographic characteristics.

For this preliminary analysis, all patient records that were missing diagnosis, sex, and date of birth were excluded from the study. We further eliminated individuals serving outside of the military or Public Health Service and individuals born before 1880 or after 1988 (assuming that the date of birth was entered in error). Further, records were excluded before unduplicating the demographic data files upon which the bias analysis is based. Since the file contains multiple records per patient, it is possible that a patient may appear in both included and excluded groups. This lack of independence may dampen the differences observed between the two groups.

In assessing potential biases we chose to look at four patient characteristics: (1) age, (2) sex, (3) service affiliation, and (4) relationship to sponsor (primary beneficiary). Results of this assessment are as follows:

- **Age**--Distributional differences rarely exceed two percentage points in any group. The only exceptions are in older groups, i.e., patients aged 50-59 and 65 and over where the differences approached five percent.

- **Sex**--The observed differences were modest. Of the excluded patients, 45.5 percent were male compared to 47.6 percent among the included.

- **Service Affiliation**--Strong similarities exist in terms of service affiliation. Exclusions showed somewhat higher representation by the Army (40.8 percent versus 34.1), and a somewhat lower representation by patients in the Navy (21.4 percent versus 27.0 percent) and the Coast Guard (7.7 percent versus 10.5 percent).

- **Relation to the Sponsor**--In terms of sponsorship, the only notable difference was that the inclusions were more likely to be patients who were the sponsor (34.7 percent versus 28.8 percent).

In summation, there is little evidence to suggest that significant biases are associated with dropping selected records from the file.

(2)   Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) Data Base

The principal issue associated with the CHAMPUS data is the generation of visit-level records. The creation of such a file may entail removal of records from the claims data base that lack sufficient data for regrouping. We will conduct a bias assessment of these exclusions once the file conversion algorithm has been implemented.

(3)   U.S. Army Ambulatory Care Data Base (ACDB)

As noted earlier, in cleaning the ACDB, incomplete records were dropped from the file. The cleaned data base includes 1.1 million of 2.7 million records that were collected through April 30, 1987. The version of the data base that was provided to B&D represents a "split half" of the cleaned data base containing 516,006 visit records. Such a dramatic loss of records introduces the potential for significant bias.

CHAPTER IV

CHARACTERISTICS OF PATIENTS SELECTED FOR STUDY

IV. CHARACTERISTICS OF PATIENTS SELECTED FOR STUDY

The following discussion explores the attributes of the patient underlying patient populations for the three data bases. Available demographic data are limited, so the discussion focuses on age, sex, service branch/affiliation, and relationship of the patient to the primary beneficiary. Exhibit IV-1 displays selected demographic data for all three data bases.

1. UNIFORMED SERVICES TREATMENT FACILITIES (USTF) DATA BASE

All of the following statistics are based upon unduplicated patient counts. Data on age and sex are reported by facility in Exhibit IV-2. Other data on service branch and the relationship of the patient to the primary beneficiary are also shown by facility in Exhibit IV-3.

- **Age--**Overall, 21.8 percent of the patients are aged under 20 years old and another 16.6 percent are 65 years and older. More than half of this population is aged 40 years and older.

  In terms of facility-specific characteristics, Staten Island has the lowest percentage of patients under 20 years old, 8.6 percent, as well as one of the highest percentages of patients 65 and over years old, 21.9 percent. This same tendency was noted for Boston (13.0 percent young and 25.1 percent old) and Seattle (16.0 percent young and 27.1 percent old). In terms of overall numbers, Seattle was responsible for treating approximately 25 percent of the 29,447 USTF patients in the oldest age category. Cleveland and Galveston, on the other hand, appeared to treat relatively more patients in the younger (under 20 years old) age groups, 25.7 and 28.3 percent respectively. This tendency was observed for all groups under 40 years of age.

  Nassau Bay and Portland are remarkable for the large numbers of infants that they treat. These two facilities were responsible for 48 percent of the 2,296 infants treated by USTFs.

- **Sex--**Overall, 52.4 percent of all patients were female and 47.6 percent were male. There is some variation by facility. A relatively high proportion of patients in Baltimore are female (59.4 percent). Males represented the largest patient group in half of the facilities: Portland (50.4 percent), Boston (54.9 percent), Staten Island (53.7 percent), Cleveland (54.9 percent), and Galveston (50.4 percent).

- **Service Branch--**The U.S. Army represented approximately one-third of the USTF patients and, thus, was the largest single patient group. The Navy accounted for another 27.0 percent, and the Air Force, 22.7 percent. These three services accounted for over 80 percent of the observed patient population.

- **Relation to the Primary Beneficiary--**The primary beneficiary was the sponsor in 35.1 percent of this unduplicated study population. Spouses represented the second largest group at 34.7 percent. Children of the sponsor represented 19.1 percent of the patients. Sponsor status was unknown for 11 percent of patients.

  Boston, Staten Island, and Cleveland all reported nearly half of their patients to be the sponsor. Children represented at least one quarter of the patients in Nassau Bay, Houston, and Galveston.

EXHIBIT IV-1

NUMBER AND PERCENT DISTRIBUTION OF SELECTED
CHARACTERISTICS OF THE UNDUPLICATED PATIENT POPULATIONS
FOR ALL THREE DATA BASES

CHARACTERISTICS	USTF		CHAMPUS[1]		ACDB	
	No.	Percent	No.	Percent	No.	Percent
AGE (IN YEARS)						
TOTAL	177,691	100.1	2,139,024	100.0	228,200	99.9
< 1	2,296	1.3	143,523	6.7	6,243	2.7
1 - 4	10,714	6.0	169,054	7.9	12,067	5.3
5 - 14	15,164	8.5	235,996	11.0	20,160	8.8
15 - 19	10,674	6.0	164,636	7.7	33,812	14.8
20 - 29	21,351	12.0	264,436	12.4	74,886	32.8
30 - 39	17,166	9.7	211,819	9.9	30,814	13.5
40 - 49	21,946	12.4	253,408	11.8	17,873	7.8
50 - 59	31,016	17.5	409,783	19.2	16,474	7.2
60 - 64	17,917	10.1	268,004	12.5	6,974	3.1
> 64	29,447	16.6	18,365	0.9	8,897	3.9
SEX						
TOTAL	177,691	100.0	2,139,024	100.0	228,682	100.0
Male	84,586	47.6	712,577	33.3	129,574	56.7
Female	93,105	52.4	1,426,447	66.7	99,108	43.3

[1] Frequencies are based upon total claims.

EXHIBIT IV-1

NUMBER AND PERCENT DISTRIBUTION OF SELECTED
CHARACTERISTICS OF THE UNDUPLICATED PATIENT POPULATIONS
FOR ALL THREE DATA BASES

CHARACTERISTICS	USTF		CHAMPUS[2]		ACDB	
	No.	Percent	No.	Percent	No.	Percent
RELATION TO PRIMARY BENEFICIARY						
TOTAL	158,056	100.0	2,139,024	100.0	N/A	N/A
Self	62,369	39.5	333,107	15.6	N/A	N/A
Spouse	61,699	39.0	1,078,355	50.4	N/A	N/A
Child	33,988	21.5	727,562	34.0	N/A	N/A
MILITARY SERVICE						
TOTAL	175,916	99.9	2,138,585	100.1	N/A	N/A
Army	60,051	34.1	613,215	28.7	N/A	N/A
Navy	47,556	27.0	713,361	33.4	N/A	N/A
Air Force	39,989	22.7	565,105	26.4	N/A	N/A
Coast Guard	18,519	10.5	54,559	2.6	N/A	N/A
Marines	8,967	5.1	186,079	8.7	N/A	N/A
Public Hlth Serv	834	.5	6,266	0.3	N/A	N/A

[2] Frequencies are based upon total claims. Active duty military are not eligible for CHAMPUS.

CHARACTERISTIC		SEATTLE	NASSAU BAY	BALTIMORE	BOSTON	HOUSTON	STATEN ISLAND	PORTLAND	PORT ARTHUR	GALVESTON	CLEVELAND
AGE TOTAL	Percent	100.01	100.00	100.00	100.00	100.01	100.00	100.00	100.02	100.00	100.01
	(No.)	(27,034)	(30,487)	(28,515)	(22,572)	(17,793)	(6,159)	(29,862)	(7,425)	(3,865)	(3,979)
< 1	Percent	.79	1.81	.86	.38	2.02	.15	1.84	2.09	1.53	1.71
	(No.)	(213)	(553)	(245)	(85)	(359)	(9)	(550)	(155)	(59)	(68)
1 - 4	Percent	3.40	6.22	5.27	3.51	8.63	2.83	8.68	8.38	9.39	7.97
	(No.)	(918)	(1,897)	(1,504)	(792)	(1,536)	(174)	(2,591)	(622)	(363)	(317)
5 - 14	Percent	6.17	10.74	8.46	5.44	10.79	3.65	9.47	9.76	11.88	10.78
	(No.)	(1,667)	(3,273)	(2,411)	(1,229)	(1,919)	(225)	(2,827)	(725)	(459)	(429)
15 - 19	Percent	5.65	8.72	5.19	3.69	8.27	1.92	5.41	7.37	5.54	5.23
	(No.)	(1,527)	(2,658)	(1,481)	(834)	(1,471)	(118)	(1,616)	(547)	(214)	(208)
20 - 29	Percent	8.57	11.78	9.62	14.33	11.56	16.90	13.20	11.06	22.17	18.82
	(No.)	(2,316)	(3,592)	(2,743)	(3,235)	(2,056)	(1,041)	(3,941)	(821)	(857)	(749)
30 - 39	Percent	7.27	9.24	10.00	11.97	8.05	16.69	9.22	5.74	9.75	20.46
	(No.)	(1,966)	(2,817)	(2,851)	(2,701)	(1,433)	(1,028)	(2,753)	(426)	(377)	(814)
40 - 49	Percent	11.82	13.50	14.16	9.68	12.81	12.14	11.96	12.69	9.29	12.87
	(No.)	(3,196)	(4,117)	(4,037)	(2,184)	(2,279)	(748)	(3,572)	(942)	(359)	(512)
50 - 59	Percent	18.04	18.81	22.24	14.25	18.16	13.61	15.21	18.02	13.09	9.83
	(No.)	(4,878)	(5,734)	(6,342)	(3,216)	(3,231)	(838)	(4,542)	(1,338)	(506)	(391)
60 - 64	Percent	11.18	7.91	13.87	11.65	8.30	10.21	8.73	10.86	5.51	4.17
	(No.)	(3,022)	(2,411)	(3,956)	(2,630)	(1,477)	(629)	(2,607)	(806)	(213)	(166)
> 64	Percent	27.12	11.27	10.33	25.10	11.42	21.90	16.28	14.05	11.85	8.17
	(No.)	(7,331)	(3,435)	(2,945)	(5,666)	(2,032)	(1,349)	(4,863)	(1,043)	(458)	(325)
SEX TOTAL	Percent	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	(No.)	(27,034)	(30,487)	(28,515)	(22,572)	(17,793)	(6,159)	(29,862)	(7,425)	(3,865)	(3,979)
Female	Percent	55.93	51.96	59.44	45.07	54.65	46.34	49.64	52.65	49.62	45.09
	(No.)	(15,120)	(15,842)	(16,948)	(10,173)	(9,724)	(2,854)	(14,823)	(3,909)	(1,918)	(1,794)
Male	Percent	44.07	48.04	40.56	54.93	45.35	53.66	50.36	47.35	50.38	54.91
	(No.)	(11,914)	(14,645)	(11,567)	(12,399)	(8,069)	(3,305)	(15,039)	(3,516)	(1,947)	(2,185)

FACILITY

EXHIBIT IV-3

NUMBER AND PERCENT DISTRIBUTION OF PATIENTS
BY SELECTED CHARACTERISTICS
UNIFORMED SERVICES TREATMENT FACILITIES

CHARACTERISTIC	FACILITY									
	SEATTLE	NASSAU BAY	BALTIMORE	BOSTON	HOUSTON	STATEN ISLAND	PORTLAND	PORT ARTHUR	GALVESTON	CLEVELAND
MILITARY SERVICE TOTAL Percent	99.99	99.99	100.01	100.00	100.00	99.99	100.00	100.00	99.99	100.00
(No.)	(27,031)	(30,110)	(28,514)	(22,557)	(17,262)	(5,852)	(29,845)	(6,934)	(3,832)	(3,979)
Army	24.72	29.38	55.23	32.88	44.31	48.80	19.67	35.26	23.98	40.69
Navy	37.02	17.79	17.40	27.18	18.85	22.04	45.11	25.54	14.09	19.65
Air Force	22.15	35.54	18.12	24.94	26.42	9.72	14.52	24.86	16.54	17.22
Coast Guard	11.46	11.01	3.19	9.59	2.28	13.35	17.25	8.38	40.19	14.83
Marines	3.59	6.16	5.00	4.88	8.07	5.33	3.36	5.96	5.09	7.56
Public Health Service	1.05	0.11	1.07	0.53	.07	0.75	0.09	0.00	0.10	0.05
RELATION TO BENEFICIARY Percent	99.99	100.00	100.00	100.00	100.00	100.00	99.99	100.00	100.00	100.00
(No.)	26,133	29,007	23,865	18,439	17,464	5,505	24,190	6,819	3,844	2,790
Self	39.34	36.29	24.92	59.57	32.44	61.22	39.82	36.97	42.82	64.30
Spouse	43.78	36.72	51.53	30.52	38.11	34.24	33.72	41.56	30.33	35.16
Child	16.87	26.99	23.55	9.91	29.45	4.54	26.45	21.47	26.85	0.54

2.   **CHAMPUS**

The demographic data reported in Exhibit IV-1 represent an unduplicated CHAMPUS patient population. The major attributes of this patient population are discussed below:

- **Sex**--Of the total unduplicated patient records (1.2 million), 34.5 percent are male and 65.5 percent are female.

- **Age**--Less than one percent of the records represent patients 65 years old or older who are ineligible for CHAMPUS services. Overall, the age distribution seems smoother than that observed for the other study patient populations, with a slight preponderance in the younger age groups. Thirty-seven percent of the patients are aged under 20 years, 34 percent between the ages of 20 and 49, and the remainder in the oldest age groups.

- **Service Branch**--The Navy and Marine Corps sponsors together consist of 42.2 percent of the records, the Army 29.1 percent, and the Air Force 25.8 percent.

  Active duty personnel are not eligible to be CHAMPUS beneficiaries. Those records designated as "self" are retirees who have not reached 65 years old and, thus, are not Medicare eligible.

3.   **U.S. ARMY AMBULATORY CARE DATA BASE (ACDB)**

We were limited by the availability of specific data elements to thoroughly pursue the characteristics of this patient population. Our findings pertinent to age and sex, by reporting facility (see Exhibit IV-4), are as follows:

- **Age**--Most of the service population of these facilities is young. Overall, 31.7 percent are younger than 20 years old and 64.4 percent fall between ages 20 and 64 years old. Only 3.9 percent are 65 plus years of age. This population is much younger than that reported in the USTF, with only 22 percent aged 40 or more years.

  The observed age distribution varies dramatically by facility. Ft. Sam Houston, for example, has a high percentage of patients in the oldest group (9.1 percent 65 years old or older). Ft. Jackson and the Redstone Arsenal treat relatively high proportions of patients who are under 20 years old (40.1 and 36.3 percent respectively). Ft. Jackson is remarkable for the very high proportion of its patients who are aged between 15 and 29 (67 percent compared to 46 percent overall).

- **Sex**--The service population is, overall, predominantly male (56.7 percent). This preponderance is consistent across facilities and is especially large at Ft. Polk where males represent 60.3 percent of the service population.

CHARACTERISTIC		MILITARY TREATMENT FACILITY					
		REDSTONE ARSENAL	FORT CAMPBELL	FORT POLK	FORT BRAGG	FORT JACKSON	BAMC FORT SAM HOUSTON
AGE TOTAL	Percent	99.99	100.02	99.99	100.00	100.00	100.00
	(No.)	(18,198)	(42,012)	(29,356)	(33,206)	(50,844)	(54,584)
< 1	Percent	3.47	3.15	4.27	3.13	1.39	2.36
	(No.)	(632)	(1,323)	(1,254)	(1,039)	(707)	(1,288)
1 - 4	Percent	7.81	5.80	7.38	6.74	2.04	5.07
	(No.)	(1,421)	(2,435)	(2,166)	(2,239)	(1,037)	(2,769)
5 - 14	Percent	14.96	8.63	10.34	9.30	4.07	10.29
	(No.)	(2,722)	(3,626)	(3,036)	(3,088)	(2,071)	(5,617)
15 - 19	Percent	10.08	9.24	9.29	9.21	32.59	10.52
	(No.)	(1,835)	(3,880)	(2,728)	(3,058)	(16,568)	(5,743)
20 - 29	Percent	17.90	41.23	40.59	39.42	34.54	21.51
	(No.)	(3,258)	(17,320)	(11,916)	(13,090)	(17,559)	(11,743)
30 - 39	Percent	14.40	15.75	14.44	14.63	9.78	13.75
	(No.)	(2,621)	(6,616)	(4,240)	(4,858)	(4,974)	(7,505)
40 - 49	Percent	11.83	7.18	6.79	7.41	5.06	10.40
	(No.)	(2,153)	(3,018)	(1,994)	(2,461)	(2,571)	(5,676)
50 - 59	Percent	10.87	5.58	4.16	6.26	5.56	11.04
	(No.)	(1,979)	(2,343)	(1,220)	(2,078)	(2,829)	(6,025)
60 - 64	Percent	4.34	1.80	1.25	1.95	2.32	5.93
	(No.)	(789)	(755)	(367)	(648)	(1,180)	(3,235)
> 64	Percent	4.33	1.66	1.48	1.95	2.65	9.13
	(No.)	(788)	(696)	(435)	(647)	(1,348)	(4,983)
SEX TOTAL	Percent	100.00	100.00	100.00	100.00	100.00	100.00
	(No.)	(18,247)	(42,091)	(29,424)	(33,233)	(50,889)	(54,798)
Female	Percent	45.64	40.34	39.68	43.22	42.22	47.95
	(No.)	(8,328)	(16,979)	(11,674)	(14,362)	(21,487)	(26,278)
Male	Percent	54.36	59.66	60.32	56.78	57.78	52.05
	(No.)	(9,919)	(25,112)	(17,750)	(18,871)	(29,402)	(28,520)

CHAPTER V

CASE-MIX AND ILLNESS EPISODE DURATIONS

V. CASE-MIX AND ILLNESS EPISODE DURATIONS

Case-mix was examined in terms of both diagnosis and the provision of health services. The following discussion represents preliminary efforts at characterizing these important attributes of the service population suggests that such analyses are both feasible and valid. An examination of time intervals between visits and the time span of patient records suggests that there may be problems with the data in analyzing episodes of illness. As in prior discussions, each data base is considered separately.

1. ANALYSIS OF DIAGNOSTIC CASE-MIX

Diagnostic case-mix is an essential element of health care resourcing activities. Presumably, if one knows the distribution of illness within the service population, then resources can be planned based upon the amount and types of care generally provided for these illnesses.

(1) Uniformed Services Treatment Facilities (USTF) Data Base

USTF case-mix data are summarized for the top 46 diagnoses in Exhibit V-1. Fifty percent of total reported diagnoses were represented by only 46 diagnoses. Of these diagnoses, nearly half (49 percent) were classified with "V" codes which are used when someone who is not sick receives health services for a specific purpose (exam) or when circumstances or a problem is present that influences the person's health status, but does not represent a current illness. The code should only be used as a supplementary code. Those "V" codes which ranked among the top ten diagnoses included:

- Other counseling, not elsewhere classified (V65.4)

- Laboratory examination (V72.6)

- Radiological examination (V72.5)

- Routine general medical examination at a health care facility (V70.0)

- Gynecological examination (V72.3)

Most of the medical diagnoses found within the top 50 percent were for acute conditions. The leading medical diagnosis was for essential hypertension, unspecified (401.9). Other medical diagnoses in the top ten include:

- Allergic rhinitis, cause unspecified (477.9)

- Diabetes mellitus, adult onset or unspecified as to type (250.00)

- Otitis media, unspecified (382.9)

This latter diagnosis was confined largely to children. It should be noted that one of the top ten diagnoses, "00000," was erroneous.

Case-mix differences represented by the top five diagnoses in each facility are shown in Exhibit V-2. As shown by this exhibit, there is a wide variation between facilities in terms of predominant conditions. Those conditions that were among the top five for at least three facilities were as follows:

DIAGNOSIS CODE	DIAGNOSIS DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
V65.4	Other Counseling, Not Elsewhere Classified	100,588	9.97	100,588	9.97
V72.6	Laboratory Examination	57,793	5.73	158,381	15.70
401.9	Essential Hypertension, Unspecified	44,554	4.42	202,935	20.12
00000	Invalid Code	20,750	2.06	223,685	22.18
V72.5	Radiological Examination, Not Elsewhere Classified	17,574	1.74	241,259	23.92
V70.0	Routine General Medical Examination At A Health Care Facility	17,421	1.73	258,680	25.65
477.9	Allergic Rhinitis, Cause Unspecified	14,797	1.47	273,477	27.12
V72.3	Gynecological Examination	11,922	1.18	285,399	28.30
250.00	Diabetes Mellitus Without Mention Of Complication, Adult-Onset Or Unspecified As To Type	11,472	1.14	296,871	29.44
382.9	Otitis Media, Unspecified	11,127	1.10	307,998	30.54
465.9	Acute Upper Respiratory Infections Of Unspecified Sites	10,204	1.01	318,202	31.55
367.9	Disorder Of Refraction And Accomodation, Unspecified	9,030	0.90	327,232	32.45
V70.9	Unspecified General Medical Examination	8,264	0.82	335,496	33.27
V72.2	Dental Examination	7,691	0.76	343,187	34.03
702	Other Dermatoses	7,603	0.75	350,790	34.78
V20.2	Routine Infant Or Child Health Check	7,389	0.73	358,179	35.51
367.4	Presbyopia	7,088	0.70	365,267	36.21
V68.1	Issue Of Repeat Prescriptions	6,994	0.69	372,261	36.90
462	Acute Pharyngitis	6,886	0.68	379,147	37.58
599.0	Urinary Tract Infection, Site Not Specified	6,604	0.65	385,751	38.23
789.0	Abdominal Pain	6,591	0.65	392,342	38.88
V72.8	Other Specified Examinations	6,426	0.64	398,768	39.52
414.0	Coronary Atherosclerosis	6,283	0.62	405,051	40.14
414.9	Chronic Ischaemic Heart Disease, Unspecified	5,760	0.57	410,811	40.71
367.1	Myopia	5,484	0.54	416,295	41.25
473.9	Unspecified Sinusitis (Chronic)	5,352	0.53	421,647	41.78
600	Hyperplasia Of Prostate	5,262	0.52	426,909	42.30

DIAGNOSIS CODE	DIAGNOSIS DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
786.50	Chest Pain, Unspecified	5,222	0.52	432,131	42.82
692.9	Contact Dermatitis Or Eczema, Unspecified Cause	5,077	0.50	437,208	43.32
367.0	Hypermetropia	4,951	0.49	442,159	43.81
493.9	Asthma, Unspecified	4,732	0.47	446,891	44.28
V70.00	Routine General Medical Examination At A Health Care Facility	4,700	0.47	451,591	44.75
715.90	Osteoarthritis, Unspecified Whether Generalized Or Localized, Site Unspecified	4,613	0.46	456,204	45.21
079.9	Unspecified Viral Infection	4,495	0.45	460,699	45.66
496	Chronic Airway Obstruction, Not Elsewhere Classified	4,447	0.44	465,146	46.10
558.9	Other And Unspecified Noninfectious Gastroenteritis And Colitis	4,319	0.43	469,465	46.53
784.0	Headache	4,313	0.43	473,778	46.96
726.2	Lumbago	4,104	0.41	477,882	47.37
616.10	Vaginitis And Vulvovaginitis, Unspecified	4,008	0.40	481,890	47.77
272.4	Other And Unspecified Hyperlipidemia	3,972	0.39	485,862	48.16
366.9	Unspecified Cataract	3,762	0.37	489,624	48.53
706.1	Other Acne	3,718	0.37	493,342	48.90
627.2	Menopausal Or Female Climacteric States	3,567	0.35	496,909	49.25
272.0	Pure Hypercholesterolemia	3,547	0.35	500,456	49.60
714.0	Rheumatoid Arthritis	3,394	0.34	503,850	49.94
V70.5	Health Examination Of Defined Subpopulations	3,390	0.34	507,240	50.28

DIAGNOSIS CODE	DIAGNOSIS DESCRIPTION	FACILITY									
		SEATTLE	NASSAU BAY	BALTI-MORE	BOSTON	HOUSTON	STATEN ISLAND	PORT-LAND	PORT ARTHUR	GALVES-TON	CLEVE-LAND
V65.4	Other Counseling, Not Elsewhere Classified	1									
V72.6	Laboratory Examination	2									
401.9	Essential Hypertension, Unspecified	4	1	1	2	2	2	1	4		4
00000	Invalid Code					1			1		
V72.5	Radiological Examination, Not Elsewhere Classified	3									
V70.0	Routine General Medical Examination At A Health Care Facility			3	1		1			2	
477.9	Allergic Rhinitis, Cause Unspecified		2		5	4					
V72.3	Gynecological Examination			2	4		4				
250.00	Diabetes Mellitus Without Mention Of Complication, Adult-Onset Or Unspecified As To Type					5					
382.9	Otitis Media, Unspecified		4					2	3		2
465.9	Acute Upper Respiratory Infections Of Unspecified Sites		3								
V70.9	Unspecified General Medical Examination							3			
V72.2	Dental Examination		5								
702	Other Dermatoses					3					5
V20.2	Routine Infant Or Child Health Check			4						4	
367.4	Presbyopia				3						1
V68.1	Issue Of Repeat Prescriptions										
V72.8	Other Specified Examination	5					5				
414.0	Coronary Atherosclerosis						3				
V70.5	Health Examination Of Defined Subpopulation										3
V67.0	Follow-up Examination Following Surgery									5	
V82.8	Special Screening For Other Specified Conditions			5							
250.0	Diabetes Mellitus Without Mention Of Complication							5			
V67.59	Follow-up Examination Following Other Treatment, Other									1	
V72.0	Examination Of Eyes And Vision							4			
V20.1	High Risk Infant									3	
V71.8	Observation For Other Specified Suspected Conditions								2		
46.3	Acute Tonsillitis								5		

- Essential hypertension (401.9)

- Routine general medical examination (V70.0)

- Allergic rhinitis (477.9)

- Gynecological examination (V72.3)

- Otitis media, unspecified (382.9)

- Routine infant or child care (V20.2)

Essential hypertension was either the first or second most common diagnosis in six of the 12 facilities. Half of these six diagnoses were medical. Only the diagnosis "routine infant or child care" failed to show up among the overall top 10 USTF diagnoses. It is interesting to note that the last two of these diagnoses relate specifically to child care.

(2)   Civilian Health and Medical Program of the Uniformed Services (CHAMPUS)

The number and percent distribution of the top 50 diagnoses for the CHAMPUS patient population are shown in Exhibit V-3. Fifty percent of all diagnoses are represented by this list.

The types of diagnoses encountered differ markedly from those described for the two other patient populations. The distribution of illnesses is both more chronic and more serious. Only one "V" code appears in this group.

Twenty-five percent of all diagnoses were represented by the top 10 diagnoses on this list. Two of these diagnoses relate to children (382.9 and V20.2), three to psychiatric problems (300.4, 309.2, and 300.0), and three to relatively mild and probably acute conditions (477.9, 46.2, and 465.9). The remaining problems (401.9 and 493.9) are clearly chronic and generally associated with adult patients.

Given the absence of the elderly from the CHAMPUS population, it is difficult to believe that this population is so much more severely and chronically ill than patients in the other two populations. It is hypothesized that while Military Treatment Facilities represent the chief source of routine and preventive care for this population, CHAMPUS may be used more often to address the more serious and potentially debilitating conditions.

(3)   U.S. Army Ambulatory Care Data Base (ACDB)

Similar to the case for the USTF data base, 50 percent of total reported ambulatory care diagnoses were accounted for by only 50 diagnoses (see Exhibit V-4). The "V" codes accounted for 38.6 percent of the top 50 diagnoses while "S" codes that were developed for the ACDB accounted for another 1 percent.

"V" codes which ranked among the top 10 diagnoses were:

- Person with feared complaint in whom no diagnosis was made (V65.5)

- Routine general medical examination at a health care facility (V70.00

- Exam well woman (V72.31)

- Supervision of normal pregnancy (V22)

EXHIBIT V-3

NUMBER AND PERCENT DISTRIBUTION OF
FIFTY MOST COMMON DIAGNOSES
CHAMPUS DATA BASE
PAGE 1 OF 4

DIAGNOSIS CODE	DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT[1]
300.4	Neurotic Depression	114,698	4.63	114,698	4.63
309.2	Adjustment Reaction With Predominant Disturbance	77,410	3.12	192,108	7.75
382.9	Unspecified Otitis Media	74,287	3.00	266,395	10.74
477.9	Allergic Rhinitis, Cause Unspecified	73,074	2.95	339,469	13.69
401.9	Essential Hypertension, Unspecified	68,221	2.75	407,690	16.44
V20.2	Routine Infant Or Child Health Check	60,439	2.44	468,129	18.88
300.0	Neurotic Disorders, Anxiety States	45,772	1.85	513,901	20.72
465.9	Acute Upper Respiratory Infections Of Unspecified Sites	42,377	1.71	556,278	22.43
462	Acute Pharyngitis	35,093	1.42	591,371	23.85
493.9	Asthma, Unspecified	33,714	1.36	625,085	25.21
309.0	Brief Depressive Reaction	33,141	1.34	658,226	26.54
786.5	Chest Pain	28,555	1.15	686,781	27.69
250.0	Diabetes Mellitus Without Mention Of Complication	27,821	1.12	714,602	28.81

EXHIBIT V-3

NUMBER AND PERCENT DISTRIBUTION OF
FIFTY MOST COMMON DIAGNOSES
CHAMPUS DATA BASE
PAGE 2 OF 4

DIAGNOSIS CODE	DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT[1]
789.0	Abdominal Pain	26,543	1.07	741,145	29.88
490	Bronchitis, Not Specified As Acute Or Chronic	24,933	1.01	766,078	30.89
296.2	Major Depressive Disorder, single Episode	24,060	0.97	790,138	31.86
296.3	Major Depressive Disorder, Recurrent Episode	22,430	0.90	812,568	32.76
995.3	Allergy, Unspecified	20,782	0.84	833,350	33.60
599.0	Urinary Tract Infection, Site Not specified	19,716	0.80	853,066	34.40
784.0	Headache	18,218	0.74	871,284	35.13
558.9	Unspecified Noninfectious Gastroenteritis And Colitis	17,245	0.70	888,529	35.83
174.9	Malignant Neoplasm Of female Breast, Unspecified	17,033	0.69	905,562	36.51
313.8	Other Or Mixed Emotional Disturbances Of Childhood	16,269	0.66	921,831	37.17
473.9	Unspecified Sinusitis (Chronic)	15,752	0.64	937,583	37.80
309.4	Mixed Disturbance Of Emotions And Conduct	15,571	0.63	953,154	38.43
692.9	Dermatitis, Unspecified Cause	15,485	0.62	968,639	39.06

DIAGNOSIS CODE	DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT[1]
847.0	Neck Sprain	15,140	0.61	983,779	39.67
616.1	Vaginitis And Vulvovaginitis	15,132	0.61	998,911	40.28
724.2	Lumbago	13,899	0.56	1,012,810	40.84
466.0	Acute Bronchitis	13,725	0.55	1,026,535	41.39
799	Ill-Defined And Unknown Causes Of Morbidity/Mortality	12,953	0.52	1,039,488	41.91
719.4	Pain In Joint	12,357	0.50	1,051,845	42.41
314.0	Attention Deficit Disorder	12,321	0.50	1,064,166	42.91
715.9	Osteoarthrosis, Unspecified Whether Generalized Or Localized	11,957	0.48	1,076,123	43.39
714.0	Rheumatoid Arthritis	11,871	0.48	1,087,994	43.87
414.0	Coronary Atherosclerosis	11,795	0.48	1,099,789	44.34
313.0	Overanxious Disorder	11,687	0.47	1,111,476	44.81
463	Acute Tonsillitis	11,676	0.47	1,123,152	45.29

EXHIBIT V-3

NUMBER AND PERCENT DISTRIBUTION OF
FIFTY MOST COMMON DIAGNOSES
CHAMPUS DATA BASE
PAGE 4 OF 4

DIAGNOSIS CODE	DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT[1]
724.5	Backache, Unspecified	11,579	0.47	1,134,731	45.75
311	Depressive Disorder, Not Elsewhere Classified	11,312	0.46	1,146,043	46.21
312.2	Socialized Conduct Disorder	11,289	0.46	1,157,332	46.66
627.2	Menopausal Bleeding	11,213	0.45	1,168,545	47.12
346.9	Migraine, Unspecified	11,180	0.45	1,179,725	47.57
716.9	Arthropathy Unspecified	10,341	0.42	1,190,066	47.98
706.1	Other Acne	10,031	0.40	1,200,097	48.39
486	Pneumonia, Organism Unspecified	9,106	0.37	1,209,203	48.75
461.9	Acute Sinusitis, Unspecified	8,962	0.36	1,218,165	49.12
301.8	Other Personality Disorders	8,852	0.36	1,227,017	49.47
340	Multiple Sclerosis	8,670	0.35	1,235,687	49.82
496	Chronic Airway Obstruction, Not Classified Elsewhere	8,443	0.34	1,244,130	50.16

[1]The cumulative percent may not agree with the sum of the percent shown due to rounding.

DIAGNOSIS CODE	DIAGNOSIS DESCRIPTION [1]	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
V65.5	Person With Feared Complaint In Whom No Diagnosis Was Made	45,993	8.91	45,993	8.91
V22	Supervision Of Normal Pregnancy	17,969	3.48	63,962	12.39
460.2	Upper Respiratory Infection Acute (Cold) *	13,731	2.66	77,693	15.05
V70.0	Routine General Medical Examination	12,673	2.46	90,366	17.51
729.5	Pain In Limb	10,969	2.13	101,335	19.64
401	Essential Hypertension	9,859	1.91	111,194	21.55
382.0	Suppurative And Unspecified Otitis Media	8,619	1.67	119,813	23.22
V72.31	Gynecological Examination	8,525	1.65	128,338	24.87
845.0	Sprains And Strains, Ankle	6,482	1.26	134,820	26.13
460	Acute Nasopharyngitis (Common Cold)	5,808	1.13	140,628	27.26
462	Acute Pharyngitis	5,696	1.10	146,324	28.36
724.5	Backache, Unspecified	5,490	1.06	151,814	29.42
79.9	Unspecified Viral Infection	5,324	1.03	157,138	30.45
848	Other And Ill-Defined Sprains And Strains	5,053	0.98	162,191	31.43
34.0	Streptococcal Sore Throat	3,679	0.71	165,870	32.14
461	Acute Sinusitis	3,667	0.71	169,537	32.85
789.0	Abdominal Pain	3,541	0.69	173,078	33.54
367.1	Myopia	3,520	0.68	176,598	34.22
477	Allergic Rhinitis	3,464	0.67	180,062	34.89
782.1	Rash And Other Nonspecific Skin Eruption	3,459	0.67	183,521	35.56
729.89	Other Musculoskeletal Symptoms Referable To Limbs, Other	3,145	0.61	186,666	36.17
558.90	Gastroenteritis *	3,105	0.60	189,771	36.77
V20.2	Routine Infant Or Child Health Check	3,021	0.59	192,792	37.36
S229.8	Social Work Problems, Other, 1	2,922	0.57	195,714	37.93
729.8	Other Musculoskeletal Symptoms Referable To Limbs	2,907	0.56	198,621	38.49
959.71	Injury/Pain, Knee, NOS *	2,775	0.54	201,396	39.03
784.0	Headache	2,759	0.53	204,155	39.56

DIAGNOSIS CODE	DIAGNOSIS DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
78.1	Viral Warts	2,729	0.53	206,884	40.09
367.25	Astigmatism, Myopic *	2,707	0.52	209,591	40.61
493	Asthma	2,664	0.52	212,255	41.13
278.0	Obesity	2,624	0.51	214,879	41.64
848.92	Sprain/Strain, Muscles & Tendons *	2,543	0.49	217,422	42.13
706.1	Other Acne	2,538	0.49	219,960	42.62
924.9	Contusion Of Lower Limb And Of Other Unspecified Sites, Unspec Site	2,512	0.49	222,472	43.11
V68.1	Issue Of Repeat Prescriptions	2,511	0.49	224,983	43.60
V53.71	Needs Orthotic Appliance *	2,496	0.48	227,479	44.08
724.2	Lumbago	2,435	0.47	229,914	44.55
466.0	Acute Bronchitis	2,434	0.47	232,348	45.02
372.30	Conjunctivitis, Unspecified	2,381	0.46	234,729	45.48
719.4	Pain In Joint	2,339	0.45	237,068	45.93
V25.01	Prescription Of Oral Contraceptives	2,230	0.43	239,298	46.36
599.0	Urinary Tract Infection, Site Not Specified	2,230	0.43	241,528	46.79
381.4	Nonsuppurative Otitis Media, Not Specified As Acute Or Chronic	2,173	0.42	243,701	47.21
V23	Supervision Of High Risk Pregnancy	2,128	0.41	245,829	47.62
879.81	Laceration, Simple (<2 Inch) *	2,111	0.41	247,940	48.03
786.5	Chest Pain	2,108	0.41	250,048	48.44

DIAGNOSIS CODE	DIAGNOSIS DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
829	Fracture Of Unspecified Bones	2,101	0.41	252,149	48.85
389.1	Sensorineural Hearing Loss	2,029	0.39	254,278	49.24
V61.10	Marital Problems	1,989	0.39	256,267	49.63
703.0	Ingrowing Nail	1,97·	0.38	258,240	50.01

1. Nonstandard diagnostic codes noted by asterisk.

The medical diagnoses among the top 10 diagnoses were:

- Acute pharyngitis (460.2)
- Pain in limb (729.5)
- Essential hypertension (401)
- Suppurative and unspecified otitis media (382.0)
- Sprains and strains, ankle (845.0)
- Acute nasopharyngitis (460)

As was the case for the USTF, aside from essential hypertension, the medical diagnoses were for acute conditions.

Case-mix differences among the six ACDB facilities are shown in Exhibit V-5. The following five diagnoses were among the top five in at least four of the six reporting facilities:

- Person with feared complaint (V65.5)
- Pregnancy, normal (V22)
- Hypertension, essential (401)
- Upper respiratory infection, acute (460.2)
- Exam, medical (V70.0)

The diagnosis "person with feared complaint" (V65.5) was ranked highest in five of the six ACDB facilities. "Normal pregnancy" (V22) was ranked second in half of the facilities. Overall, there appears to be much more consistency between ACDB facilities in terms of diagnoses. As noted previously, "person with feared complaint" is probably being used as a catchall code for when a precise diagnosis is not readily obtainable.

2. ANALYSIS OF PROCEDURAL CASE MIX

The types of services provided in an ambulatory visit are both a direct reflection of resource intensity and, to some degree, an indicator of illness severity. As such, they represent another important element of health resourcing activities.

(1) Uniformed Services Treatment Facilities (USTF) Data Base

As shown in Exhibit V-6, the first 25 procedure codes accounted for 69 percent of all initial codes. The distribution was extremely skewed, with 50 percent of the procedure codes represented by the following six codes:

- DOD clinic visit (99500)
- Supplies provided (99070)
- Established patient intermediate service (90060)

EXHIBIT V-5

FIVE MOST COMMON RANKED DIAGNOSES (1 = HIGH)
BY FACILITY
U.S. ARMY AMBULATORY CARE DATA BASE

DIAGNOSIS CODE	DIAGNOSIS DESCRIPTION	FACILITY					
		BAMC FORT SAM HOUSTON	FORT JACKSON	FORT CAMPBELL	FORT POLK	FORT BRAGG	REDSTONE ARSENAL
V65.5	Person With Feared Complaint	1	1	1	1	1	3
V72.31	Exam, Well Woman	2		4			
V22	Pregnancy, Normal	3		2	2	2	
382.0	Otitis Media, Suppurative, Acute	4					4
401	Hypertension, Essential	5	5	5			2
729.5	Pain, Extremity		2				
460.2	Upper Respiratory Infection, Acute		3		5	3	5
845.0	Sprain/Strain, Ankle		4			5	
V70.0	Exam, Medical			3	4	4	1
S229.8	Social Work Problems, Other, I				3		

EXHIBIT V-6

NUMBER AND PERCENT DISTRIBUTION OF
TWENTY FIVE MOST COMMON PROCEDURES
UNIFORMED SERVICES TREATMENT FACILITIES

PROCEDURE CODE	PROCEDURE DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
99500	DOD Clinic Visit	195,017	14.0	195,017	14.0
99070	Supplies Provided	152,821	11.0	347,838	25.0
90060	Old Patient, Intermediate	151,589	10.9	499,427	35.9
00000	Unknown Code	88,225	6.3	587,652	42.2
90050	Old Patient, Limited	77,947	5.6	665,599	47.8
90070	Old Patient, Extended	38,195	2.7	703,794	50.5
90040	Old Patient, Brief	23,720	1.7	727,514	52.2
36415	Venipuncture	19,505	1.4	747,019	53.6
99501	Clinic Count (Different from Clinic Visit)	19,383	1.4	766,402	55.0
82270	Blood; Occult, Feces, Screening	18,390	1.3	784,792	56.3
99520	Outpatient Service With No Charge	18,344	1.3	803,136	57.6
90015	New Patient, Intermediate	17,537	1.3	820,673	58.9
85027	Automated Hemogram	15,819	1.1	836,492	60.0
90020	New Patient, Comprehensive	15,159	1.1	851,651	61.1
90080	Old Patient, Comprehensive	14,514	1.0	866,165	62.1
71020	Radiological Exam	13,623	1.0	879,788	63.1
88150	Cytopathology	12,742	0.9	892,530	64.0
80019	Blood Chemistry, 19 Or More Tests	12,559	0.9	905,089	64.9
81002	Routine Urinalysis	10,822	0.8	915,911	65.7
92012	Eye Exam	8,249	0.6	924,160	66.3
76091	Mammogram	8,176	0.6	932,336	66.9
90515	New Patient, Intermediate	7,715	0.6	940,051	67.5
90010	New Patient, Limited	7,708	0.6	947,759	68.1
99999	Unknown Code	7,699	0.6	955,458	68.7
81000	Urinalysis	7,549	0.5	963,007	69.2

- Unknown (00000)

- Established patient limited service (90050)

- Established patient extended service (90070)

Within the top 25 procedures, 36 percent were categorized under "office and other outpatient medical services." The second most frequently coded procedure is code 99070, which is defined as:

> Supplies and materials (except spectacles), provided by the physician over and above those usually included with the office visit or other services rendered (list drugs, trays, supplies, or materials provided).

Most of the other procedures relate to ancillary services provided during the course of a typical office visit such as blood testing, urinalysis, and radiological exams.

Exhibit V-7 shows the five most frequently reported procedures by facility. It is not surprising that "old patient, intermediate" places within the top five procedures code at most of the facilities and is first in ranking at Boston, Port Arthur, and Galveston. At Nassau Bay and Houston, "DOD Clinic Visit", which is a special USTF code, is the most frequently reported code, while at Seattle and Portland, "Supplies Provided", is the most common code, and at Baltimore, "00000", which is an unknown code, is the most common.

(2)   Civilian Health and Medical Program of the Uniformed Services (CHAMPUS)

The 25 of the most common primary procedures provided to CHAMPUS beneficiaries are summarized in Exhibit V-8. Six of the top 25 procedures are represented by special CHAMPUS codes that generally relate to charges and purchases and are, thus, not normally associated with the provision of a health care service. The first four procedures accounted for 25 percent of all procedures on this list. One of these codes represents a charge for ancillary services (99088). Two relate to a standard office visit with an established patient (90050 and 90060) and one relates to psychiatric services (90844). Seven of the top 25 procedures relate to routine office care.

The types of services featured among the top 25 are more comparable to the USTF data base than to the ACDB, reflecting the needs of a population that are more chronically ill and somewhat older than the active duty military population.

(3)   U.S. Army Ambulatory Care Data Base (ACDB)

The first 25 procedure codes (see Exhibit V-9) accounted for 54 percent of all the initial codes. The procedure codes are much more evenly distributed than was observed for the USTF data base. Nine procedures accounted for 25 percent of the reported codes as follows:

- **Exam, general medical (90024)**

- **Exam, complaint specific medical (90009)**

- **Antepartum care only (59420)**

- **Nurse-patient counseling (99157)**

- **Exam, eye, comprehensive (92004)**

EXHIBIT V-7

FIVE MOST COMMON RANKED PROCEDURES (1 = HIGH)
BY FACILITY
UNIFORMED SERVICES TREATMENT FACILITIES

PROCEDURE CODE	PROCEDURE DESCRIPTION	FACILITY									
		SEATTLE	NASSAU BAY	BALTIMORE	BOSTON	HOUSTON	STATEN ISLAND	PORTLAND	PORT ARTHUR	GALVESTON	CLEVELAND
99500	DOD Clinic Visit		1			1			2		
90060	Old Patient, Intermediate	2	2	2	1	2	4	2	1	1	3
99070	Supplies Provided	1						1			
90050	Old Patient, Limited	3		3			1	3		3	
00000	Unknown Code			1		3					
90070	Old Patient, Extended		4	4		4			3	2	
90040	Old Patient, Brief				3						2
36415	Venipuncture	4			2						
90020	New Patient, Comprehensive				4	5					
99501	Clinic Count (Different From Clinic Visit)		3								
85027	Hemogram And Platelet Count Automated	5							5		
90015	New Patient, Intermediate										
99520	Outpatient Service With No Charge		5								
88150	Cytopathology										5
71020	Radiological Exam									5	
93010	Routine EKG Interpretation And Report				5						
81000	Urinalysis							5			
90510	Emergency Dept., New Patient, Limited								4	4	
99999	Unknown Code										1
95125	Multiple Antigens						2				
97110	Physical Medicine Treatment										4
90095	Unknown Code			5							
90550	Emerg. Dept, Estab. Pat., Limited Service										
85021	Hemogram, Automated						3				
85023	Hemogram And Platelet Count						5	4			
89.04	Miscoded										

EXHIBIT V-8

NUMBER AND PERCENT DISTRIBUTION OF
TWENTY FIVE MOST COMMON PROCEDURES
CHAMPUS DATA BASE
PAGE OF 1 OF 2

PROCEDURE CODE	PROCEDURE DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
90050	Established Patient, Limited Service	370,582	6.92	370,582	6.92
90844	Psychiatric Therapeutic Procedures, Approx. 45 To 50 Minutes	360,021	6.72	730,603	13.64
99088	Other Room, Ancillary And Drug charges (Special CHAMPUS Code)	335,301	6.26	1,065,904	19.90
90060	Established Patient, Intermediate Service	278,089	5.19	1,343,993	25.10
6878	Oxygen Equipment And Supplies, PURCHASE (Special CHAMPUS Code)	171,138	3.20	1,515,131	28.29
84999	Unlisted Chemistry Or Toxicology Procedure	169,970	3.17	1,685,101	31.47
90599	Emergency Room Charge (Special CHAMPUS Code)	140,808	2.63	1,825,909	34.10
76499	Unlisted Diagnostic Radiologic Procedure	136,614	2.55	1,962,523	36.65
90040	Established Patient, Brief Service	112,494	2.10	2,075,017	38.75
81000	Urinalysis, With Microscopy	94,129	1.76	2,169,146	40.51
6942	Other Equipment And Supplies, PURCHASE (Special CHAMPUS Code)	94,032	1.76	2,263,178	42.26
90782	Therapeutic Or Diagnostic Injection	89,717	1.68	2,352,895	43.94
95125	Multiple Antigens	87,454	1.63	2,440,349	45.57

PROCEDURE CODE	PROCEDURE DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
90595	Physician's Charge (Special CHAMPUS Code)	84,302	1.57	2,524,651	47.14
6888	Nutrition Equipment And Supplies, PURCHASE (Special CHAMPUS Code)	74,645	1.39	2,599,296	48.54
99070	Supplies And Materials Provided By The Physician	63,712	1.19	2,663,008	49.73
90070	Established Patient, Extended Service	56,315	1.05	2,719,323	50.78
95001	Allergy Testing, 31-60 Tests	54,811	1.02	2,774,134	51.80
95023	Allergy Testing, More Than 30 Tests	49,936	0.93	2,824,070	52.74
71020	Radiologic Examination, Chest, Two Views	48,528	0.91	2,872,598	53.64
90020	New Patient, Comprehensive Service	44,751	0.84	2,917,349	54.48
90010	New Patient, Limited Service	44,488	0.83	2,961,837	55.31
90015	New Patient, Intermediate Service	44,351	0.83	3,006,188	56.14
80019	19 Or More Clinical Chemistry Tests	40,215	0.75	3,046,403	56.89
85022	Hemogram, Automated	40,117	0.75	3,086,520	57.64

EXHIBIT V-9

NUMBER AND PERCENT DISTRIBUTION OF
TWENTY FIVE MOST COMMON PROCEDURES
U.S. ARMY AMBULATORY CARE DATA BASE

PROCEDURE CODE	PROCEDURE DESCRIPTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
90024	Exam, General Medical	33,589	6.36	33,589	6.36
90009	Examine, Complaint Specific Medical	19,709	3.73	53,298	10.10
59420	Antepartum Care, Routine	15,440	2.92	68,738	13.02
99157	Nurse-Patient Counseling	15,131	2.87	83,869	15.89
92004	Exam, Eye, Comprehensive	12,223	2.32	96,092	18.20
90025	Exam, Pelvic/Pap Smear	10,679	2.02	106,771	20.22
90032	Exam, Pelvic	10,049	1.90	116,820	22.13
95851	Range Of Motion Measurements And Report	9,522	1.80	126,342	23.93
90013	Exam, Breast	9,327	1.77	135,669	25.70
06023	Therapeutic Exercise	7,799	1.48	143,468	27.17
95831	Muscle Testing, Manual	7,750	1.47	151,218	28.64
99155	Counseling	6,783	1.29	158,001	29.93
92100	Serial Tonometry With Medical Evaluation	6,724	1.27	164,725	31.20
02068	Spectacle Procedure, Military	6,620	1.25	171,345	32.45
02404	Interview, Evaluation	5,976	1.13	177,321	33.59
81000	Urinalysis (Dip & Spin)	5,860	1.11	183,181	34.70
95920	Evaluation, Neurovascular	5,645	1.07	188,826	35.77
92001	Exam, Eye, Triage	5,311	1.01	194,137	36.77
06034	Patient Education	5,195	0.98	199,332	37.76
04011	Evaluation, Range Of Motion, Neuromuscular Status	5,109	0.97	204,441	38.72
02001	Health Education/Counseling, Hearing Conservation	5,039	0.95	209,480	3
90016	Exam, Eye, Limited	4,640	0.88	214,120	40.56
04029	MSE, Knee	4,287	0.81	218,407	41.37
90026	Exam, Physical, Partial	4,238	0.80	222,645	42.17
02067	Spectacle Procedure, Civilian	4,208	0.80	226,853	42.97

- Exam, pelvic/pap smear (90025)

- Exam, pelvic (90032)

- Range of motion measurements and report (95851)

- Exam, breast (90013)

Four of the nine procedures relate specifically to women.

Overall, types of reported procedures are much more specific than those offered in USTF data base. None of the initial 25 codes could be classified as "office and other outpatient medical services".

The top five procedures are shown by facility in Exhibit V-10. The procedure "exam, general medical" (90024) is the highest ranked in four out of six facilities and falls within the top five in all six. The only other procedure that falls within the top five in all six facilities is "exam, complaint, special medical" (90009). Four of the procedures ranked within Exhibit V-10 do not appear among the top 25 procedure shown in Exhibit V-9. These procedures are associated with single facilities and, thus, may represent some facility-specific idiosyncracy. These procedures are:

- Health education/counseling, hearing conservation (02001)

- Shot record review (90700)

- EFMP assessment (90765)

- Teaching, other direct patient (99083)

3.   ANALYSIS OF ILLNESS EPISODE DURATIONS

Two dimensions of time were measured to determine the appropriateness of the data bases for representing episodes of illness. These deliberations were limited to the USTF and ACDB data pending the conversion of the CHAMPUS data to an encounter-based file. The two studied time dimensions are as follows:

- **Span of Record Coverage**--This measure represents the total average length in days between the first and the last patient-specific record encountered. This is roughly analogous to person-days available for study.

- **Interval Between Visits For A Specific Diagnosis**--This measure serves as a rough gauge of continuity of care and represents the average number of days between visits for a specific diagnosis.

A more thorough analysis must be made with respect to specific diagnoses before we can be sure that these data bases are suitable for episodes of illness analysis. A long interval between visits would suggest that the data base is of limited utility for episodes of illness studies.
The following determinations were made with respect to the two data bases under study:

- **USTF**--Fifty percent of all patient visit data showed spans of 105 days or less. Only approximately 10 percent of the records had a span of a year or more. This short time span would complicate the assessment of episodes of illness associated with chronic conditions that require regular ongoing monitoring and care.

EXHIBIT V-10

FIVE MOST COMMON RANKED PROCEDURES (1 = HIGH)
BY FACILITY
U.S. ARMY AMBULATORY CARE DATA BASE

PROCEDURE CODE	PROCEDURE DESCRIPTION	FACILITY					
		BAMC-SAM HOUSTON	FORT JACKSON	FORT CAMPBELL	FORT POLK	FORT BRAGG	REDSTONE ARSENAL
02001	Health Education/Counseling, Hearing Conservation			3			
02404	Interview, Evaluation				5	5	
59420	Antepartum Care, Routine			2	1	3	
90009	Examine, Complaint Specific Medical	2	5	4	3	3	2
90013	Exam, Breast	5					
90024	Exam, General Medicine	1	3	1	2	1	1
90025	Exam, Pelvic/Pap Smear	4					
90032	Exam, Pelvic			5			
90700	Shot Record Review						5
90765	EFMP Assessment					4	
92001	Exam, Eye, Triage		4				
92004	Exam, Eye, Comprehensive	3			4		
95831	Muscle Testing, Manual		2				
95851	Range Of Motion Measurements And Report		1				
99083	Teaching (Other Direct Patient)						4
99157	Nurse-Patient Counseling					2	3

In terms of intervals between visits for specific diagnoses, the median value was 39.5 days. Given this interval and the limited available time span, we would generally have only three observation points per patient. Only five percent of the visits involved a return within approximately one calendar week. It should be noted that the interval analysis was based on only 3,568 observations for which data were available.

● ACDB--Time spans for the ACDB were not found to be much longer than for the USTF. In this case, fifty percent of all patient visit data showed spans of 114 days or less--slightly longer than the USTF. As with the USTF, approximately 10 percent of the records had a span of a year or more.

In terms of intervals between visits for specific diagnoses, the median value was 40 days. As was observed for the USTF, this time interval would permit only three observations per patient in a given year. The ACDB did show proportionately more intervals of short duration than the USTF. Ten percent of all return visits were within a week or less. This interval analysis was based on only 1,714 cases.

It should also be reiterated that ACDB results are based on a 50 percent sample of all available records. The inclusion of these additional data would likely reduce the interval between visits for specific diagnoses and might, as well, increase the observed span of time between the first and last visits.

4. SUMMARY OF FINDINGS

These preliminary findings suggest that data from all three data bases exhibit considerable face validity as descriptors of case-mix measured by diagnoses and by procedures. Analyses of time intervals associated with patient visits suggests that at least two of the data bases may be deficient in characterizing episodes of illness.

All three data bases could be considered in a state of change. The CHAMPUS data base has required the most manipulation. At this stage, it provides an accurate view of the principal procedures but duplicates diagnoses and thus may affect the results for diagnostic case-mix. The USTF data also need structural refinements to represent an outpatient encounter, but further changes will not affect the overall distribution of procedures or diagnoses. Finally, since the ACDB represents a 50 percent sample of all available observations, the case-mix results could change if the entire file was used.

CHAPTER VI

FEASIBILITY ASSESSMENT

VI. FEASIBILITY ASSESSMENT

This discussion addresses five issues that pertain to the feasibility of using these data bases in other study activities. We have refrained from a discussion of the CHAMPUS data base since additional processing efforts dedicated to the development of encounter-based records will help us better assess the utility of this data base.

1. SCOPE OF THE DATA

How well do these data bases provide the appropriate kind of patients and the appropriate type of data to support grouping and other analyses. Three dimensions of scope were considered for this analysis:

- **Patient Demographics**--It is essential to be able to describe patients by age and sex since these factors often affect the severity of illness, prognosis, and the type and duration of therapy. Age and sex are incorporated in both the AVG and APG grouping strategies.

  In the multi-faceted military health care system, we need to know more about patient auspices to incorporate data into resource planning. Additional data elements include service duty status (active or other), military service organization (Army, Navy, Marines, Air Force), and relation to primary beneficiary (self, child or spouse).

- **Health Care Encounter**--It is possible to assign some AVGs on the basis of diagnosis alone. The ability to assign a visit to a particular group will benefit from additional data on the types of procedures provided in the course of a visit--the more procedures the better. The AVG methodology includes the capability of processing an indefinite number of procedures, and it will select most significant procedure (for grouping) from among those provided.

  APGs benefit from additional information on the content of the health visit, including signs and symptoms, acuity, complexity or severity, site, and specialty of practitioner.

  We also need data on time to distinguish between one visit and another, usually the date of the visit. Other distinguishing factors include provider (see below) and clinic identifiers. These are especially important for efforts to define episodes of illness.

- **Resource Utilization**--If the objective is simply to group, then we must track resource utilization through the services provided. However, since personnel resourcing is a primary activity of the current procurement, we need to identify the types of personnel engaged in specific encounters, types of services provided, and effort expended. Cost data may also serve as a useful proxy for resource utilization if no other data are available.

Each of these data bases presents limitations with respect to scope. These limitations are as follows:

- **The USTF Data Base**--Demographic data appear to be sufficient. Data pertinent to the health care encounter are sometimes dubious. Diagnoses were missing from approximately 14.5 percent of the available records. Procedure codes appear to include high proportions of fairly unspecific codes. Resource data are very constrained. Specific provider types are not readily identifiable and there are no data available on provider service times. The only cost datum relates to the amount paid by other insurance.

- **The CHAMPUS Data Base**--Demographic data are sufficient. Data pertinent to the health care encounter are of high quality, although the association of non-primary procedures with a specific encounter may not always be feasible. Available resource data include the amounts

billed and allowed for each procedure, but not the provider time. Specific provider "major specialty" types are available, as are general provider capacity categories.

- **The Ambulatory Care Data Base (ACDB)**--The utility of the ACDB is highly constrained by the number of variables that were made available for this project. As noted previously, only a limited number of data fields are available. Demographics are limited to age and sex. In terms of encounters, data are only available for the primary diagnosis but do cover multiple procedures. Unfortunately, the procedure codes are nonstandard and will require extensive revision before they can be used in ambulatory care groupers. The availability of provider times enhances the resource utilization component, but it is impossible to identify the type of provider.

2. DATA STRUCTURE

Structural issues consider how well the reporting units correspond to the needs of other uses. Most other planned uses relate primarily to encounters and, to some extent, to unduplicated patients.

Data need to be structured in such a way as to be useful for planned activities. Analysis focuses on patients and more so on outpatient visits/encounters. Outpatient visits are represented by any documented encounter that involves the following:

- Ascertainment of symptoms

- Observation of the patient

- Diagnostic assessment of the patient

- Provision of prescribed treatment

- Provision of counseling/education

In the military, this encounter can be with any health care practitioner who is credentialed to perform these tasks, regardless of education and training, and who is categorized as the principal provider of care.

There is flexibility regarding how outpatient visits are defined. Thus, for example, a health education session on diabetes to a group of patients that ends with a finger stick could be counted as one visit (for the entire group) or as a visit for each participant. This flexibility exists even within branches of the armed services.

Ostensibly, both the USTF data base and the ACDB report on outpatient visits. Our experience suggests that in both cases, care must be taken to ensure that the data as reported do, in fact, represent individual outpatient visits. For example, in both files, we have observed multiple encounters with the same provider in the same day.

Only one of the data bases, the ACDB, can be said to represent outpatient encounters as its fundamental units. The USTF records hold data segments that relate to up to six outpatient visits. More than one segment, however, may relate to a single encounter. The CHAMPUS data base represents the most radical departure from an encounter base. In CHAMPUS, the records reflect claims and, thus, relate more to reimbursement than to outpatient visits. Both the USTF and CHAMPUS data bases will have to be converted to a true encounter base to be subjected to the case-mix analysis software. Processes have been developed to support this conversion.

3.   COMPLETENESS AND ACCURACY

This represents the fundamental data quality issue. How much are the data plagued with quality-related issues and how much will this affect the utility of the data for subsequent activities? Completeness and accuracy issues that are associated with the two target data bases are as follows:

- **The USTF Data Base**--A very high percentage of records in this data base, about one in every seven, was excluded for lack of a valid diagnosis code. Haphazard coding of diagnoses, characterized by inconsistent use of the decimal point, also makes them difficult to interpret. Our analyses also indicate that 19 percent of the procedure codes are invalid.

- **The CHAMPUS Data Base**--Only standard diagnosis codes were used by CHAMPUS; however, several non-standard procedure codes were used. Six of the 25 most frequently reported procedures were based upon these non-standard codes. Overall, this claims data base extensive appears to have high coding validity.

- **The Ambulatory Care Data Base (ACDB)**--Both non-standard diagnosis and procedure codes were used extensively in the ACDB. The extensive edit procedures appear to have supported a high overall data quality.

4.   TIME SERIES

Time issues are reflected in several key issues. These concerns include:

- The currency of the data

- The periodicity of data collection (ongoing or one-shot)

- The period covered

- The ability of the data to reflect the course of care for particular patients in a given period

The following discussion relates these issues to the two target data bases:

- **The USTF Data Base**--The USTF represents an ongoing data collection effort. The current data base includes records through December 31, 1988. Data for 1989 have just become available. The typical patient has records that span a 105 day period. The time between visits for a specific diagnosis is typically about 40 days. Thus, the typical patient will probably have three encounter records for any given diagnosis that requires ongoing care.

- **The Ambulatory Care Data Base (ACDB)**--The ACDB represents a one-shot data collection effort. Data collection occurred continuously over the period 1985 to 1987. The typical ACDB patient has records that cover a 114 day period. The median time between visits for a specific diagnosis was also 40 days, yielding three encounter records for any given diagnosis for a typical patient who requires ongoing care.

5.   RELEVANCE TO THE MILITARY

Relevance relates to how well the data represent the type of care provided at military treatment facilities, and how sensitive the data bases are to the unique properties of the military health care system, such as the predominance of nonphysician health care providers?

Ostensibly, the ACDB should be superior to the USTF in terms of its relevance to the military. It is the only data base that relies on actual U.S. Army Medical Treatment Facilities (MTFs). Further, the data seem to reflect those diagnoses and procedures common to U.S. Army MTFs. For example, a review of the top 50 percent of the diagnoses and procedures revealed results common to a young population with young families and a rigorous physical training program. This was supported by the high percentage of diagnoses for acute orthopedic problems, pregnancies, and child-related problems. The absence of key fields as well as its one-shot nature diminishes the superiority of this data base.

CHAPTER VII

RECOMMENDED USES FOR THE DATA BASES

VII. RECOMMENDED USES FOR THE DATA BASES

This analysis suggests that all data bases have their limitations. Our ultimate concern is how well these data bases will support the three prime applications:

- Ambulatory care grouping strategies

- Description of case-mix and service utilization

- Episodes of illness

The following discussion briefly reports our recommendations with respect to each of these uses.

1. AMBULATORY CARE GROUPING STRATEGIES

In terms of grouping strategies, once we resolve the unknown diagnostic codes, the USTF data base contains the minimum required data for AVGs and can be used without much modification. The ACDB is a less suitable vehicle due to the use of nonstandard diagnostic and procedural codes. Cross-walks are under development to facilitate grouping of these data. Preliminary reports on the CHAMPUS data base suggest that diagnostic coding may be inaccurate. The utility of this latter data base is still being assessed.

At this point, none of the data bases appear to have sufficient data to support their use with Ambulatory Patient Groups. Hopefully, ongoing modifications to this grouper will reduce its imposing data burden.

2. DESCRIPTION OF DIAGNOSTIC AND PROCEDURAL CASE-MIX

In this report, we used all three data bases to describe diagnostic case-mix and service utilization. Results of this effort seem reasonable given what we know about the service population. The ACDB, which subsumes a generally more active and younger patient population, shows case-mix patterns that reflect the problems of such populations such as pregnancy, acute respiratory illness, and sprains and strains. The greater age of the USTF population is reflected in the relative importance of adult onset diabetes. The higher prevalence of more chronic and severe health problems in the CHAMPUS data base may reflect a preference to use this source for nonroutine health care.

Overall, the results for all data bases exhibit considerable face validity. CHAMPUS diagnostic coding seems very consistent with ICD-9 conventions, but a lot of nonstandard codes (non-CPT4) are used for procedures. The ACDB coding integrity appears better than that of the USTF, but the modifications of prevailing coding practices in this data base will make comparisons with other patient populations difficult.

3. EPISODES OF ILLNESS

Analyses of time-related data suggest that neither the ACDB nor the USTF will be particularly suitable for the development of episodes of illness given both the relatively small number of continuing cases and the relatively long time intervals between visits. Neither data base includes sufficient data to ascertain whether an episode of illness has truly ended or is simply not reflected in intervening visits. Both files do have provision for the reporting of multiple diagnoses. Of the two diagnostic fields available in the ACDB, only one was provided in our version of this file. Further, the utility of the ACDB for this type of analysis is also hampered by the fact that the available data base is only a 50 percent sample of the available cleaned data.

Preliminary evidence with respect to CHAMPUS suggests that this data base will also be a poor source for the development of illness episodes. Dates are frequently missing from the records and "episode" billing appears to be erratic.

Efforts to develop episodes of illness based on these data require further developmental stages. The next effort should be an assessment of the utility of the data with respect to specific diagnoses. As suggested by Dr. Joanna Lion, one of the developers of the AVGs, the following diagnoses appear appropriate for an initial effort:

- Otitis media

- Anxiety/Depression

- Karpal tunnel syndrome

- Vasectomy

- Diabetes

- Bronchoscopy

As is often the case with analyses of this sort, the deeper we investigate the issues, the more complex these issues become.

ENDNOTES

1. J. M. Georgoulakis, J. P. Moon, et al. **The Army Ambulatory Care Data Base (ACDB) Study: Implementation And Preliminary Data.** Office of the Assistant Secretary of Defense for Health Affairs. Report No. HR 88-002B. September, 1988. p. 39.

APPENDIX A

MEMORANDA ASSOCIATED WITH OBTAINING ACCESS TO THE USTF AND ACDB

HEALTH AFFAIRS
(HEALTH MANAGEMENT SYSTEMS)

30 March 1990

MEMORANDUM FOR DMIS PROJECT OFFICER

SUBJECT: Release of Uniformed Services Treatment Facilities
Clinical Data for CY 1988 and CY 1989

The Comprehensive Health Care Management (CHCM)
Demonstration Project has designated a portion of technology
development to the ambulatory arena. In so doing, we have a
requirement to begin to analyze all available ambulatory data
with disease and procedure detail. The analysis will focus on
the value of patient classification measures for the Department
of Defense (DoD) within the scope of the CHCM effort and serve
as a source of data helpful in the definition of future data
requirements.

Request a copy of the 1988 and 1989 data from Uniformed
Services Treatment Facilities be submitted by data tape to our
analysis site at Fort Detrick, MD. As per our earlier
discussion, if the 1989 data are not complete, from an editing
and collection perspective, a subsequent submission would be
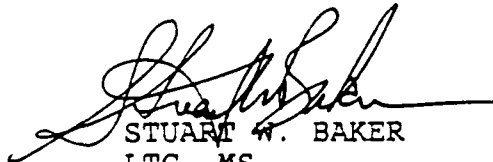acceptable.

The work involves analysis of a series of ambulatory data
bases supported by a CAAS contract study to develop an
application of Ambulatory Visit Groups (AVGs) for DoD. As you
know, the Department was directed by Public Law 101-189 to
incorporate the ambulatory equivalent of Diagnosis Related
Groups in our resourcing model(s) for the Military Health
Services System by 1 October 1991.

The tasks to be executed in this contract are aimed at
evaluation of outpatient morbidity trends as depicted by coding
systems such as ICD-9-CM and CPT-4 and subsequently used in
patient classification systems such as AVGs. A major portion of
the work will be to test the statistical and clinical adequacy
of AVG modifications currently in progress through our Health
Care Financing Administration--Brandeis contract determining
useful modifications for the Version 2.0 AVG Grouper.

The results of this project will hopefully advance the Department's capability to direct change in the ambulatory setting both in terms of developing health policy options and evolving information systems design.

The complete mailing address for the data tapes is:

    USAISC-Ft Detrick
    Attention: ASNE-HD (Mr. David Bolling)
    Building 1422
    Ft. Detrick, MD 21701-5016

                        STUART W. BAKER
                        LTC, MS
                        Deputy Director, Resource Analysis
                            and Management Systems

Copy to:
COL Milton Turner

2

HEALTH AFFAIRS

1 4 JUN 1990

MEMORANDUM FOR COMMANDER, U.S. ARMY HEALTH CARE STUDIES AND
             CLINICAL INVESTIGATION ACTIVITY
             THROUGH: OFFICE OF THE SURGEON GENERAL OF THE
             ARMY (DASG-RMZ)

SUBJECT: Request for Access to Ambulatory Database

As previously agreed upon between representatives of our respective offices, request on-line access to data in Sample 1 of the U.S. Army Ambulatory Care Data Base (ACDB). This data will be used to design the Department's ambulatory systems requirements and develop an ambulatory resource and manpower modeling capability.

Our analysis may require clarification of data elements and related data administration issues. As such occasions arise, we look forward to the opportunity to coordinate questions and early results with members of the U.S. Army Health Care Studies staff.

Request a copy of Sample 1 fields 1-70 as listed in the ACDB Data Dictionary Sequential Files of Phase I, Report # HR90-001, dated 1 November 1989.

Your assistance in helping the Department evolve its ambulatory data requirements and modeling efforts is greatly appreciated. My points of contact on this matter are LTC Stuart W. Baker, Resource Analysis and Management Systems and LCDR Mike Saunders, Joint Manpower Office.

Harold M. Koenig, RADM, MC, USN
Deputy Assistant Secretary of Defense
(Health Services Operations)

HSHN-H (5-5)   23 July 1990

MEMORANDUM THRU

Commander, U.S. Army Health Services Command, Fort Sam Houston,
   TX 78234-6000

HQDA (DASG-PSZ/BG Scotti), 5109 Leesburg Pike, Falls Church,
   VA 22041-3258

FOR Deputy Assistant Secretary of Defense (Health Services
       Operations), ATTN: RADM Harold M. Koenig, MC, USN, HSO,
       Room 3E336, The Pentagon, Washington, DC 20350-2000

SUBJECT: Request for Army Ambulatory Care Information

1. Reference memorandum, OASD(HA), 14 Jun 90, subject: Request
for Access to Ambulatory Database.

2. In accordance with the agreement between representatives of
the U.S. Army Health Care Studies and Clinical Investigation
Activity (HCSCIA) and the Office of the Assistant Secretary of
Defense (Health Affairs), Health Services Operations Division,
data from the Army's Ambulatory Care Data Base Study (ACDB) will
be transmitted to Fort Detrick for use by Health Services
Operations personnel. The data file will consist of data from
Sample 1. More specifically, it will include all patient visits
from Sample 1 with the following variables: age, gender,
diagnosis, procedures, visit time, provider ID, and site ID.

3. As discussed in a meeting with Colonel Turner, Director of
Health Systems Planning, Policy and Architecture, on 15 May 1990,
all data in these fields have not been verified. However,
members of HCSCIA activity staff will be available for
assistance, if needed.

4. Members of the HCSCIA staff look forward to assisting you in
your endeavors.

                              DAVID A. McFARLING
                              Colonel, MC
                              Commanding